

Claims

1. Method for regulating the fuel concentration in a fuel mixture for a fuel cell which is formed by an alcohol or an ether as the fuel and water, characterized in that the fuel is fed via a controllable fuel inlet (11) to a mixing space (12), from where the fuel mixture is fed, via a fuel-mixture feedline (4), to the fuel cell (1) via a membrane (14) which is arranged downstream of the fuel inlet (11), as seen in the direction of flow, delimits a measurement chamber (16) and is selectively permeable to water and the fuel, a liquid or gaseous measurement mixture with a fuel concentration of less than 1% by volume or more than 5% by volume, depending on the quantity of fuel which permeates into the measurement chamber (16) from the fuel mixture per unit time, being produced in the measurement chamber (16), whereupon the fuel concentration in the measurement mixture is determined and the fuel inlet (11) is controlled as a function of the fuel concentration in the measurement mixture.

2. Method according to Claim 1, characterized in that a liquid or gaseous measurement mixture with a fuel concentration of less than 0.1% by volume depending on the quantity of fuel which has permeated into the measurement chamber (16) from the fuel mixture per unit time is produced in the measurement chamber (16).

3. Method according to Claim 1, characterized in that a liquid or gaseous measurement mixture with a fuel concentration of more than 10% by volume which is dependent on the quantity of fuel which has permeated into the measurement chamber (16) from the fuel mixture per unit time is produced in the measurement chamber (16).

4. Method according to one of the preceding claims, characterized in that to produce the measurement mixture in the measurement chamber (16) a

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carrier liquid or a carrier gas is used to dilute and/or remove the permeated fuel.

5. Method according to one of the preceding
claims, characterized in that the fuel concentration of
5 the measurement mixture, in the case of values above 10
or 5% by volume, is determined by means of a liquid
sensor.

6. Method according to Claim 5, characterized in
that the fuel concentration of the measurement mixture
10 is determined by means of density or viscosity
measurements.

7. Method according to Claim 5, characterized in that the fuel concentration of the measurement mixture is determined by means of optical methods.

15 8. Method according to Claim 7, characterized in that the fuel concentration of the measurement mixture is determined by means of infrared absorption.

Method according to one of Claims 1 to 4, characterized in that the fuel concentration of the measurement mixture, in the case of values below 1.0 or 0.1% by volume, is determined by means of a gas sensor.

*10. Method according to Claim 9, characterized in that the fuel concentration of the measurement mixture is determined by means of optical methods or by 25 determining the conductivity.

11. Method according to Claim 9, characterized in that the fuel concentration of the measurement mixture is determined by means of infrared absorption.

12. Fuel cell system, containing at least one fuel
30 cell (1), which can be operated with a fuel mixture
consisting of an alcohol or an ether as fuel and water,
and at least one mixing space (12), which is connected
to in each case one controllable fuel inlet (14), and
at least one fuel-mixture feedline (4), which connects
35 the at least one mixing space (12) to in each case the
at least one fuel cell (1), characterized in that the
fuel cell system has at least one measurement probe
(13), which is arranged downstream of the fuel inlet

(11), as seen in the direction of flow of the fuel mixture, and comprises

- a) a measurement chamber (16),
- b) a membrane (14) which delimits the measurement chamber (16), is in contact with the fuel mixture, is selectively permeable to the fuel and/or water and is used to produce a liquid or gaseous measurement mixture with a fuel concentration of less than 1% by volume or more than 5% by volume depending on the quantity of fuel which has permeated into the measurement chamber (16) from the fuel mixture per unit time, and
- c) a sensor (17) for determining the fuel concentration in the measurement mixture,

15 and in that the fuel cell system has means (19) for
controlling the fuel inlet (11) as a function of the
fuel concentration in the measurement mixture.

13. Fuel cell system according to Claim 12, characterized in that a gas, liquid, infrared absorption, density measurement, optical or conductivity measurement sensor is provided as the sensor (17).

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